

Important Advances in Clinical Medicine

Epitomes of Progress — Radiology

The Scientific Board of the California Medical Association presents the following inventory of items of progress in radiology. Each item, in the judgment of a panel of knowledgeable physicians, has recently become reasonably firmly established, both as to scientific fact and important clinical significance. The items are presented in simple epitome and an authoritative reference, both to the item itself and to the subject as a whole, is generally given for those who may be unfamiliar with a particular item. The purpose is to assist the busy practitioner, student, research worker or scholar to stay abreast of these items of progress in radiology which have recently achieved a substantial degree of authoritative acceptance, whether in his own field of special interest or another.

The items of progress listed below were selected by the Advisory Panel to the Section on Radiology of the California Medical Association and the summaries were prepared under its direction.

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Epidural Venography for Lumbar Disk Disease

THE EPIDURAL VENOUS PLEXUS was first visualized in 1954 when inadvertent catheter wedging occurred during cardiac catheterization. Since then, attempts at visualizing these veins have included lumbar spinous process intraosseous contrast injections and lower extremity venous injections. Because of inconsistent results and pain, these procedures did not gain popularity.

Gargano introduced the technique of selective ascending lumbar vein catheterization in 1974. This proved much more reliable and nearly painless. This procedure can generally be accomplished without admitting patients to hospital. Percutaneous puncture and catheterization of one or

both femoral veins is carried out. One catheter tip usually is placed in an ascending lumbar vein (part of the external vertebral plexus) and an optional second catheter may be placed in the presacral plexus or opposite ascending lumbar vein. Iodinated water soluble contrast is injected with serial filming during abdominal compression and forced expiration. The patient may be released from the department within one to two hours.

The findings of extradural compression of the internal vertebral venous plexus include varying combinations of the following: (1) bilateral or unilateral occlusion of the veins at a disk level, (2) asymmetric focal distortion of the usually regular venous pattern, (3) occlusion or distortion

of a radicular vein, (4) focally abnormal flow dynamics.

A frankly herniated disk which is readily seen at myelography is nearly always easily shown by venography. Lateral disk protrusions may not deform the dura or arachnoid root sleeve and, therefore, may be missed at myelography. Theoretically (and actually, in most cases) these lesions will deform the epidural veins. Previous surgical operation at a given level, however, generally obliterates portions of the venous plexus and radicular veins making interpretation of venography at that level virtually impossible.

In one study with 55 patients, 28 disk levels were explored. Disk herniation was correctly indicated at 24 levels, for an accuracy of 86 percent. There were no false positives. Myelography was correct at 23 levels. The combined accuracy of both studies was 89 percent (25 levels). Venography and myelography were concluded to be equally accurate and complementary.

Lumbar epidural venography is a safe procedure for showing the extradural compressive effects of herniated lumbar intervertebral disks. Its best use in the current clinical setting probably lies in showing the presence and site of a lesion in a patient in whom there are positive clinical and electromyographic findings but negative or equivocal findings on a myelogram.

Because of the low morbidity and outpatient nature of the examination, some might find this study an attractive initial screening procedure for a patient with strong focal symptomatology. Myelography should be considered a complementary examination.

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REFERENCES

Gargano FP, Meyer JD, Sheldon JJ: Transfemoral ascending lumbar catheterization of the epidural veins in lumbar disk disease—Clinical application and results in the diagnosis of herniated intervertebral disks of the lumbar spine. *Radiology* 111:329-336, May 1974

O'Dell CW Jr, Coel MN, Ignelzi RJ: Ascending lumbar venography in lumbar-disc disease. *J Bone Joint Surg* 59:159-163, Mar 1977

Computed Tomographic Scanning of the Larynx

THE TASK OF RADIOLOGY in evaluating laryngeal masses is to determine the extent of disease. If the mass turns out to be malignant such information helps to determine the feasibility of conservation surgical therapy or the planning of precision radiation therapy. Some of the critical areas of interest in making this decision include the

subglottic region (especially the cricoid cartilage), the anterior commissure, the cricoarytenoid joint and the interarytenoid areas. The cricoid cartilage is vital since it is the supporting structure of the entire larynx. The cross-sectional image of computed tomographic (CT) scanning provides excellent visualization of all of these critical regions. Moreover, computed tomography shows the deep tissue planes surrounding the true cords, false cords and subglottic space (paralaryngeal space). Kirchner's work shows that tumors of the larynx extend along the deep tissue planes and will spread throughout the paralaryngeal space to gain access to the preepiglottic space or invade cartilage, or both. These spreads can only be implied from positive contrast laryngography or pleuridirectional tomograms by a lack of mobility of the cords or entire larynx. In our hands xeroradiography has shown less than half of the instances of cartilage invasion by comparison to CT scanning.

Clinically, indirect and direct laryngoscopy show most of the mucosal surfaces (except those of the subglottic space and most inferior tips of the pyriform sinuses) and provide a good evaluation of glottic function, but the deep planes are again not directly visualized. Laryngography, for the most part, duplicates the information concerning function and mucosal surfaces gained by these clinical examinations.

CT scanning has essentially no morbidity (save the radiation exposure) and complements the direct laryngoscopic examination nicely. The examination is best made during quiet breathing, starting at the level of the anterior ring of the cricoid cartilage and proceeding cephalad at 5 mm intervals to the level of the hyoid bone.

Experience to date also indicates that CT provides a sensitive and complete evaluation of the traumatized laryngotracheal complex. This includes a detailed evaluation of the thyroid cartilages, cricoid ring and arytenoids. The extent of soft tissue injury and the related encroachment on the airway are readily apparent. Its lack of morbidity provides an additional benefit in acutely injured patients.

In summary, CT scanning of the larynx provides a safe, extremely informative examination of the larynx in cases of mass lesions and laryngeal trauma. At our institution, CT scanning is not just another test to be added to the workup but is replacing xeroradiography, tomography and